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AMENDMENT UNDER 37 C.F.R. § 1.116
EXPEDITED PROCEDURE
GROUP 2827
PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Yasuyoshi YAMADA

Appln. No.: 09/435,448

Group Art Unit: 2827

Confirmation No.: 5236

Examiner: Graybill, David E.

Filed: November 22, 1999

For: **BACK ELECTRODE TYPE ELECTRONIC PART AND ELECTRONIC ASSEMBLY
WITH THE SAME MOUNTED ON PRINTED CIRCUIT BOARD**

AMENDMENT UNDER 37 C.F.R. § 1.116

ATTN: BOX AF
Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Office Action dated February 25, 2002, please amend the above-identified application as follows:

IN THE CLAIMS:

Please enter the following amended claims:

7. (Twice Amended) An electronic assembly comprising:

a back electrode electronic part comprising:

a main body including a circuit, and

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electrodes provided on a back surface portion of said electronic part and connected to said circuit, wherein said electrodes are arranged into groups of electrodes at portions of the electrode arrangement;

*B'11
cont'd*
said groups of electrodes includes said electrodes having a substantially same potential level when said circuit operates;

said electronic assembly further comprising:

a printed circuit board having substrate electrodes corresponding to said electrodes provided for said electronic part, wherein one of said substrate electrodes as a first substrate electrode is provided for each of said groups of electrodes, and said substrate electrodes as second substrate electrodes other than said first substrate electrodes are provided for said electrodes of said electronic part other than in said groups of electrodes; and

solder bumps including first solder bumps connected with said groups of electrodes and said first substrate electrodes and second solder bumps connected with said second substrate electrodes and said electrodes of said electronic part other than said groups of electrodes.

REMARKS

Applicant thanks the Examiner for considering the arguments included with the Amendment filed December 12, 2001, and for removing the objections to claims 1-6.

Applicant thanks the Examiner for approving the proposed drawing corrections filed December 12, 2001.

Status of the Application

Claims 1-12 are all the claims pending in the Application. Claims 1-12 have been rejected.

Indefiniteness Rejection of Claims 7-12 Under 35 U.S.C. § 112, Second Paragraph

The Examiner has rejected claims 7-12 as being indefinite under 35 U.S.C. § 112, second paragraph. The informalities noted by the Examiner have been corrected by eliminating the obvious typographical error. Such a correction is, by its nature, non-narrowing and therefore does not create an estoppel. Thus, withdrawal of the objection is respectfully requested.

Obviousness Rejections of Claims 1-3 and 7-9 Under 35 U.S.C. § 103(a)

The Examiner has rejected claims 1-3 and 7-9 under 35 U.S.C. § 103(a) as being unpatentable over Higashiguchi et al. (US 5,828,128, hereinafter "Higashiguchi") in view of Geffken et al. (US 6,093,630, hereinafter "Geffken"). This rejection is respectfully traversed.

The Examiner again (identically to the previous Office Action) takes the position (pages 3-5 of the Office Action) that Higashiguchi teaches everything in claims 1-3 and 7-9, except "groups of said electrodes, ... wherein said group of electrodes includes electrodes having substantially same potential level when said circuit operates. Nonetheless, ... Geffken teaches

groups of electrodes 126, 128 having a substantially same potential level when a circuit operates. Moreover, it would have been obvious to combine the product of Geffken with the product of Higashiguchi because it would provide electrodes.”

Previous Arguments

Applicant has previously submitted, by the Amendment filed December 12, 2001, that neither Higashiguchi, nor Geffken, teach or suggest any “groups of electrodes,” as recited in claims 1 and 7, that the “groups of electrodes” “are provided for a single first solder bump which is larger than second solder bumps,” as recited in claim 1, or that such a solder bump would be “connected with said groups of electrodes” as recited in claim 7. Further, Applicant submitted that Higashiguchi actually teaches away from any “groups of electrodes ... for a single first solder bump.”

Examiner's Response

In response to these arguments, the Examiner, on page 8 of the Office Action, replies that Higashiguchi is “not relied on” for these teachings, and that further, the portion that Applicant has presented as teaching away “cannot be directly addressed because Applicant has not cited a particularly relevant teaching of Higashiguchi.”

Further Arguments

Applicant thanks the Examiner for emphasizing what teachings that Higashiguchi is being relied on for, i.e., that Higashiguchi does not teach or suggest at least the features listed above, and that therefore Geffken is being relied upon for teaching them.

In regards to Higashiguchi teaching away from the instant Application, Applicant submits that one of ordinary skill would look to the lands 24, 25, 26 (FIG. 5) and solder bumps 21, 22, 23

(FIGS. 5, 9A-9C) of Higashiguchi as being similar to electrode lands 12 and solder balls 13 in the prior art of the instant Application (FIG. 1).

Specifically, the Examiner has taken the position that the electrode lands 24, 25, and 26 of Higashiguchi teach or suggest the electrodes recited in claims 1 and 7 (Office Action page 3, numbered paragraph 1). However, directly opposite of the recitation of claims 1 and 7, Higashiguchi discloses that if a solder bridge 34 such as shown in FIG. 9C is found, then the device would not pass inspection. Thus, Higashiguchi discloses that only a one-to-one relationship between bumps 21-23 and lands 24-26 is acceptable, and thus, necessarily, that groups of electrodes provided for a single first solder bump are unacceptable. In other words, any group of electrodes, such as the group of electrode lands 24 and 25, that are connected by a solder bump, such as solder bridge 34, is unacceptable. Thus, Higashiguchi teaches directly away from claims 1, which recites “groups of electrodes ... provided for a single first solder bump,” and claim 7, which recites “solder bumps including first solder bumps connected with said groups of electrodes.”

Geffken

The Examiner has applied Geffken in an attempt to fill in the elements missing from the teaching of Higashiguchi, at least as discussed above. However, Applicants reiterate that Geffken does not teach such “groups of electrodes,” any more than Higashiguchi or the admitted prior art of the Application.

Geffken discloses transition layers 160, 162 and 164 that form electrical contacts with bumps 170, 172, and 174. Applicants submit that these are the only electrodes that could, for the sake of argument, possibly be read as “electrodes arranged for solder bumps on a back surface

portion of said electronic part,” as recited in claim 1. In contrast, the Examiner, even after having identified electrode lands 24-26 of Higashiguchi as the electrodes recited in claim 1, now seeks to change the definition of what constitutes “electrodes” by citing internal parts of the semiconductor device 100, i.e., contacts 126, 128. However, contacts 126 and 128 are always covered by transition layer 126, and therefore could never be “arranged for solder bumps,” and in any event, would not be considered to be the electrodes recited in the independent claims.

Further, Applicants submit that one of ordinary skill, looking to combine Higashiguchi and Geffken, would consider electrode lands 24-26 of Higashiguchi and transition layers 160, 162 and 164 of Geffken as similar elements. Thus, similarly to Higashiguchi and the admitted prior art, the only connections that are disclosed are single connections between these transition layers 160, 162 and 164, and the bumps 170, 172 and 174. The fact that there may be multiple connections beneath the transition layers 160, 162 and 164 is irrelevant to any analysis of claim 1, as it recites “electrodes arranged for solder bumps on a back surface portion of said electronic part.” The portions cited by the Examiner to allegedly teach such electrodes are clearly not “arranged for solder bumps,” i.e., they are hidden beneath the transition layer 164. In fact, assuming for the sake of argument that the references could have been combined, the resulting combination would have been no different, as viewed from the back surface portion, than that disclosed in FIGS. 9A-9C of Higashiguchi, i.e., even if the structure under electrode lands 24-26 would have been modified, electrode lands 24-26 would still have been provided.

Therefore, Applicants respectfully submit that, because Geffken fails to provide at least the features noted above that are missing from Higashiguchi, the combination of references do

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not teach or suggest all the claim limitations, and the Examiner has not established prima facie obviousness. Thus, Applicant respectfully requests the Examiner to withdraw the rejection of claims 1 and 7 based upon 35 U.S.C. § 103(a).

Dependent Claims

Applicants respectfully submit that claims 2-6 and 8-12 are allowable, at least by virtue of their dependency.

Conclusion


In view of the foregoing, it is respectfully submitted that claims 1-12 are allowable. Thus, it is respectfully submitted that the application now is in condition for allowance with all of the claims 1-12.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Please charge any fees which may be required to maintain the pendency of this application, except for the Issue Fee, to our Deposit Account No. 19-4880.

Respectfully submitted,

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Date: May 6, 2002